Small Business Innovation Research/Small Business Tech Transfer

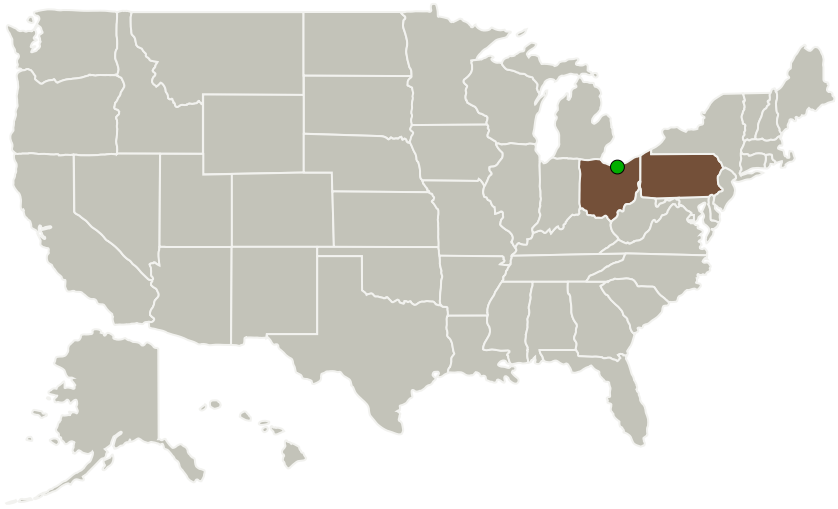
Extreme Environment Compatible Ceramic Enhanced PEBB Devices (EE-PEBB), Phase I

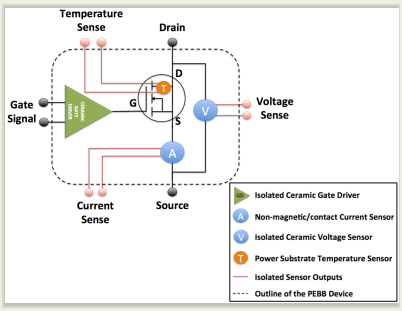
Completed Technology Project (2015 - 2015)

Project Introduction

A critical element in the NASA/NRC Technology Roadmap is to develop Power Electronic Building Block (PEBB) devices that can function in Extreme Environments. NASA's stated aim is to use high power density/high efficiency PEBB devices to streamline design and introduce size, weight, cost and efficiency savings. The formidable challenge is to design such PEBB devices that use materials that can function in Extreme Environment conditions. The proposed high power density/high efficiency PEBB solution employs ceramics, striction and wide bandgap semiconductor materials as to meet these Extreme Environment operation challenges. The design eliminates transformer magnetics and opto-isolators (required for galvanic isolation) and will eliminate external circuits and components providing lower complexity, enhanced performance, and much higher SWaP specifications than currently available. The new design and novel materials now provide a whole new level of self-monitoring capability that includes voltage, current and temperature at the device die level enabling both robust prognostics and power reconfiguration.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
QorTek Inc	Lead Organization	Industry Small Disadvantaged Business (SDB)	Williamsport, Pennsylvania
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Pennsylvania

Project Transitions

June 2015: Project Start

December 2015: Closed out

Closeout Summary: Extreme Environment Compatible Ceramic Enhanced PEB B Devices (EE-PEBB), Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/138852)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

QorTek Inc

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

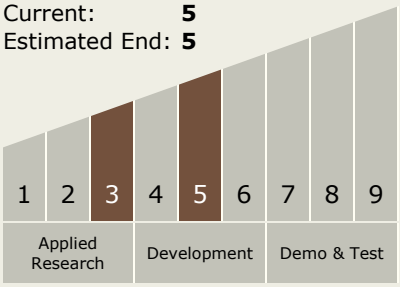
Carlos Torrez

Principal Investigator:

Ross W Bird

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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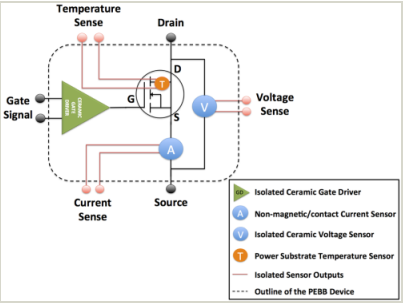
Images



Briefing Chart Image
Extreme Environment Compatible Ceramic Enhanced PEBB Devices (EE-PEBB), Phase I
(https://techport.nasa.gov/image/130458)

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.3 Power Management and Distribution
    - TX03.3.3 Electrical Power Conversion and Regulation

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System